Appendix A

CITY OF MEDICAL LAKE

SHORELINE INVENTORY AND CHARACTERIZATION

FINAL DRAFT

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1. INTRODUCTION

In 2004, the City of Medical Lake obtained a grant from the Washington State Department of Ecology (Ecology) to conduct a characterization of its shoreline jurisdiction as defined by the state's Shoreline Management Act (RCW 90.58). The purpose of this study is to conduct a baseline inventory of abiotic, biological and cultural conditions in the City of Medical Lake's shoreline jurisdiction to provide the basis for the City's Shoreline Master Program update. This characterization will help the City identify existing conditions, evaluate functions and values of resources in its shoreline jurisdiction, and explore opportunities for conservation and restoration of ecological functions. These findings will help provide a framework for future updates to the City's shoreline environment designations and shoreline management policies and regulations.

Methodology

Following Washington Department of Ecology protocols, this shoreline inventory and analysis attempts to integrate findings in an accessible manner through narrative and associated maps to inform SMP planning decisions and to provide a baseline for adaptive management and cumulative impact assessment. The resulting shoreline characterization indicates management opportunities for protection of ecological functions, restoration of degraded habitat, improving public access, and supporting water-dependent use.

Using existing reports, the protocol begins with providing a regional context, including a vicinity map, that describes the regional setting, climate, topography and land uses, and indicates the extent of shorelines that are under SMA jurisdiction. This regional context sets the stage for the characterization of ecosystem-wide processes that are influencing the ecological functions within the shoreline jurisdiction, focusing on upland and adjacent land uses that affect the flow of water, sediment, nutrients and materials. This characterization uses existing regional plans, as well as data and information from existing, studies, data and technical information, to identify management issues and determine the relationship of ecosystem-wide processes to shoreline functions, the health of those functions, and measures to protect or restore healthy processes and functions. Management issues addressed include flooding, erosion and sedimentation, loss and fragmentation of habitat, water pollution, and exotic species.

Following the characterization of ecosystem-wide processes, the protocol requires the characterization of the shoreline jurisdiction's ecological functions, which first requires mapping preliminary reach boundaries and documenting the rationale used. By overlaying the lake shoreline, land use, and aerial photos, reach boundaries are created by considering changes in land use and zoning, vegetation cover, and/or geomorphic units (e.g. notable changes in slope, surficial geology, soils, fetch, shoreline geometry).

After determining reach boundaries, assessment of the ecological function of each reach begins with overlaying biological features and critical physical areas, including fish and conservation

areas, wetlands, riparian and aquatic vegetation, frequently flooded areas, and geologically hazardous areas, such as areas of slope instability or erosion. Next, possible impacts to ecological functions are determined by overlaying shoreline modifications, including structures (e.g. bulkheads, docks, storm drains), facilities cutting across the shoreline (e.g. roads and bridges), and land uses (e.g. agriculture, impervious surfaces). The results of these overlays are provided in a narrative summary and tables describing existing shoreline functions as evidenced by the mapped physical, biological and modification features.

The final step in the shoreline characterization is to overlay cultural and regulatory constraints to future use of the shoreline, and combine that analysis with the analysis of ecological functions to identify opportunities for shoreline protection and use. Cultural resources, public access, and regulatory designations that define and/or constrain future uses are mapped and summarized in both narrative and tables. These include archaeological and historic sites, public access, and zoning designations. Ecological protection and restoration opportunities are then identified through the physical, biological and cultural modification synthesis map overlays, while public access and cultural resource protection needs and opportunities are identified through the cultural jurisdiction synthesis maps. Preliminary shoreline environmental designation boundaries are also determined for each reach, based on existing use patterns and the biological and physical characteristics of the shoreline.

Principal Data Sources

A number of Spokane County, State, and federal agency data sources, and technical reports were reviewed to characterize overall watershed conditions and to assess the ecological function of the City of Medical Lake's shorelines in a watershed context. Sources reviewed for this report include:

1) Reports and Maps:
    a. Shoreline Assessment for Spokane County Lakes (URS Corporation 2002).
    b. City of Medical Lake. 1997. Comprehensive Plan. Department of Planning, City of Medical Lake.
    c. City of Medical Lake Comprehensive Parks, Recreation, and Natural Areas Plan.
    d. Soil Survey Spokane County, Washington (Soil Conservation Service 1968)
    e. Historical Climate Information (Western Regional Climate Center. 2004)
    f. Water Quality Assessments of Selected Lakes within Washington State (Washington Department of Ecology 1998)
    g. Impacts of Eastern State Hospital and Lakeland Village Wastewater Discharges on the Quality of West Medical Lake. Washington State Department of Ecology 1992.
    h. Geologic Map of the Spokane 1:100,000 Quadrangle, Washington-Idaho (Washington Division of Geology and Earth Resources 1990).

2) Digital Databases

a. The following databases were obtained from Spokane County Information Systems Department:
    1) City of Medical Lake city limits and urban growth boundary
    2) County zoning and parcel land use
    3) Critical Aquifer Recharge/Susceptibility
    4) County soils and erodible soils developed from Natural Resources Conservation
    5) Services Spokane County Soil Survey
    6) Flood zones developed from Federal Emergency Management Agency Flood Insurance Program Maps
    7) Washington Department of Fish and Wildlife's Priority Habitats and Species and Natural Heritage Site databases (2002)
b. Federal and Washington State databases were used, including:
    1) United States Fish and Wildlife Service. (2003). National Wetlands Inventory Data.
    2) Washington State Department of Ecology. (1995). Lake Bathymetry of Washington.
    3) Washington State Department of Fish and Wildlife. (1997). GAP Species Data.
    4) Washington State Department of Ecology. (1998). DOE Facilities.
    5) Washington State Department of Fish and Wildlife. (2002). Priority Species and Habitats at 1:24,000.
    6) Washington State Department of Natural Resources. (2000). Digital 1:100,000-scale Geology of Washington.
    7) Washington State Department of Natural Resources. (2003). Transportation.
c. Data Sources Developed by Geo-Ecology Research Group
d. Aerator, storm drains, pumpstation, sewage outfalls. Digitized from City of Medical Lake Comprehensive Plan.
e. Impervious surfaces. Digitized from 2003 2-meter National Agricultural Imagery project color satellite imagery.
f. Slopes > 15%. Developed using ESRI Spatial Analyst and U.S. Geological Survey 10-m DEM.

We also conducted a field survey of the City's shoreline jurisdiction to collect information on riparian vegetation conditions and land use, as well as map the following information:

- bulkheads
- docks and boat launches
- emergent vegetation
- dump

Report Organization

The report is divided into three principal sections. After Section 1, the Introduction, Section 2 provides the regional context and characterization of watershed conditions and ecosystem-wide processes. Section 3 provides the inventory and analysis of ecological functions in the shoreline jurisdiction by reach. This section includes a presentation and discussion of the shoreline reach breaks used, and separate discussions of the physical, biological, and cultural modification, and jurisdictional characteristics of each reach. These discussions are augmented by several tables in the appendix, as well as synthesis maps included in the accompanying DVD map portfolio. Each reach-level inventory and analysis includes a summary of shoreline conditions, including draft environmental designations and identification of potential opportunities for protecting and restoring ecological functions. Again, accompanying maps are included in the DVD map portfolio.

Use of Map Portfolio

To provide final synthesis maps at appropriate viewing scales that will inform the analysis report and illustrate findings, we chose to use an electronic map portfolio accessed through ESRI ArcReader, a free, easy-to-use mapping application that allows users to view, explore, and print maps. ArcReader © is a great way to deliver interactive mapping capabilities that access a wide variety of dynamic geographic information. Using ArcReader ©, anyone can view high-quality maps created using the ArcGIS© software (ESRI 2005).

Included on the DVD are 7 main folders:

- An ArcReader90 folder
- 6 data/map folders
    - Physical (physical.pmf)
    - Biological (biological.pmf)
    - Cultural Modifications (cultural_modifications.pmf)
    - Cultural Jurisdictional (cultural_jurisdictional.pmf)
    - Protection-Restoration Opportunities (opportunities.pmf)
    - Environmental Designations (env_designations.pmf)

To begin using ArcReader to view maps, install ArcReader by navigating to the folder 'ArcReader90'. Click on Setup.exe and follow on-screen instructions.

Once ArcReader has been successfully installed, navigate to one of the data/map folders. Each of these folders contains two other folders called 'data' and 'pmf'. Ignore the data folder. Open the pmf folder and double click the pmf file with the same name as the parent folder.

If ArcReader has been installed properly (note – ArcReader will not install on PCs running Windows 98.) the ArcReader map will open up. The table of contents has intentionally been disabled in each of these ArcReader maps. Upon opening, a warning will flash on screen telling you as much, click OK. You are now ready to view and print ArcReader map files.

Each of the map files opens to the full extent of the map. If the user navigates to **VIEW → BOOKMARKS,** then they can zoom the map to each individual reach or to the extent of the entire area. This option is always available to the user. The user may also explore the map data using the zoom tool. There are two sets of zoom tools in ArcReader ©. One tool (#1) is used to zoom within the data window and the second tool (#2) is used to zoom in on the entire map document (Figure A). In most cases the user will want to use the first zoom tool.
The user may also use the software to print maps by navigating to **FILE → PRINT** on the main menu.

2. Ecosystem-Wide Summary

Location

The City of Medical Lake area is located in northeastern Washington about 12 miles southwest of Spokane. This area includes three major lakes–Medical Lake, West Medical Lake, and Silver Lake (Fig. 1). Contour lines and intermittent streams indicate that the watershed surrounding the internally drained or "closed basin" lakes is little larger than the actual lakes.

Geology, Geomorphology and Topography
The bedrock of the Medical Lake Watershed consists of Precambrian metasedimentary rocks intruded by early Cenozoic plutonic rocks. Miocene Columbia River Basalts overlie most of the older rocks. A series of west-northwest trending faults cut the bedrock at Clear Lake (Joseph, 1990).

Loess was deposited atop the bedrock surfaces during the late Pleistocene. Subsequent Missoula Floods eroded much of this loess cover and part of the Miocene Columbia River Basalts to expose underlying older bedrock. It was the Missoula flooding that likely created the north trending basins of the four lakes and subsequently deposited glaciofluvial gravels and sands. Late Pleistocene and Holocene loess was deposited atop these surfaces. Recent alluvium has been deposited in low areas south of Clear and Silver lakes (Joseph, 1990). Groundwater occurs in limited quantities in this unconfined alluvium aquifer, which consists primarily of sand and gravel with high porosity and permeability (Soltero et al, 1995). The water-bearing thickness of this aquifer, while accessible through shallow wells, is usually less than 3 m, with a widely fluctuating water table that responds rapidly to climatic fluctuations. Basalts are the most productive aquifer in the region, hydraulically connected to the lakes in the region, with groundwater generally moving northeastward into the West Plains area, dependent on topographic control (Deobald, 1995).

The Medical Lake area lies in a low relief setting with elevations ranging from 2949 feet at the top of Booth Hill to 2340 feet at the surface of Clear Lake. The higher elevations (i.e., Fancher Butte and Booth Hill) at the western margin of the watershed are composed of Precambrian metasedimentary rocks that survived the Missoula Floods. Likewise, the intrusive rocks composing Olson Hill on the north watershed margin, Riddle Hill on the eastern margin, and the upland separating Medical Lake and West Medical Lake also survived the Missoula Floods

after the overlying loess and basalts were stripped off. Elevations generally decline from northeast to southwest reflecting the Missoula Flood pathway. Drainage is a poorly developed centripetal pattern and drainage density is low. Drainage characteristics are the result of the internally drained nature of the lake basins, and the Missoula Flood erosional origins of the lake basins.

Climate

The contemporary climate of the Medical Lake watershed is influenced by the mid-latitude, continental location of the area. Mean monthly temperatures at Spokane International Airport (6 miles northeast of Medical Lake) over the 1971-2000 climate normal ranged from 28°F in January to 69°F in July with the mean annual temperature at 47°F. The peak growing season extends from April into October. Mean annual precipitation was approximately 17 inches during this same period with 63% of the precipitation falling in October through March. The cool season timing of the precipitation, combined with site latitude, continental location, and elevation, results in much of this precipitation falling as snow (Western Regional Climate Center, 2004).

Soils

Soils in the Medical Lake area vary as a result of topography and parent material. Upland soils are typically deep and well drained mollisols (Uhlig, Reardan, Dragoon, Athena, and Bong series) and entisols (Lance series) formed in glaciofluvial deposits, loess, volcanic ash, residuum, and colluvium. Soils of the lowlands surrounding the lakes range from deep, well drained mollisols in glaciofluvial deposits and loess (Hesseltine and Cheney series) to deep, poorly drained mollisols in volcanic ash and loess (Cocolalla series)(U.S. Department of Agriculture, Soil Conservation Service, 1968; Natural Resources Conservation Service, n.d.). Many of these soils are highly erodible, creating the only notable geohazard in the region (Spokane County Information Systems Department [SCISD] 2004e)(Fig. 2).

Vegetation

The Medical Lake area lies in the forest-grassland ecotone. A ponderosa pine (*Pinus ponderosa*)-Douglas fir (*Pseudotsuga menziesii)* eastside forest interspersed with bunchgrass "prairies" is the native vegetation of the area (Fig. 2). Wheat is currently grown on most of the prairies while the wooded areas are increasingly used for home sites. Common aquatic species of the lake basins include northern watermilfoil (*Myriophyllum sibiricum*), reed canarygrass (*Phalaris arundinacia*), sago pondweed (*Potamogeton pectinatus*), curly leaf pondweed (*Potamogeton crispus*), slender pondweed (*Potamogeton pusillus*), water buttercup (*Ranunculus aquatilis*), bulrush (*Scirpus spp.*), broad-leaved cattail (*Typha latifolia*), coontail (*Ceratophyllum demersum*), and duckweed (*Lemna spp.*) (Smith et al, 1998).

Land Cover and Land Uses

Medical Lake. Medical Lake is bounded by the City of Medical Lake on its northern and eastern shore (Fig. 2). Residences are the most common land use along this portion of the shoreline. The south and west shores are largely undeveloped other than a walking/biking trail that circles the lake. Eastern State Hospital sits atop the hill separating West Medical Lake from

Medical Lake. Medical Lake is a popular lake for fishing and swimming, and is also extensively used by waterfowl (Smith et al, 1998).

Silver Lake. Silver Lake is bordered by residences on the northwest and northeast sides. The north and south ends are largely undeveloped.

West Medical Lake. West Medical Lake has little human development along its shorelines. A picnic area and undeveloped area lie along the eastern shore while a pump house sits on the north end. Wheat fields lie near the western shore. A boat launch/fishing dock/boat rental occupies the south shore. West Medical Lake is a popular fishing lake.

Water Quantity and Quality

Medical Lake. Medical Lake has over 3.1 miles of shoreline, with an area of 160 acres and an average depth of 32 feet. No visible surface inlets or outlets are shown on the Medical Lake, WA 7.5' quadrangle. Measurements since 1924 suggest that Medical Lake is naturally eutrophic. High fecal coliform bacteria concentrations at the city park on the north end of the lake are likely linked to the large goose population in the area. Alum was used to treat the high nutrient loads in 1977 and an aerator was installed to increase the oxygen content in the hypolimnion (Smith et al, 1998).

Silver Lake. Silver Lake has over 8.7 miles of shoreline, with an area of 486 acres and an average depth of 30 ft. No surface inlets or outlets are shown on the Medical Lake, WA 7.5' quadrangle. Silver Lake is a mesotropic lake with higher than normal phosphorus loads (Washington Department of Ecology, n.d.[b]). Silver Lake has several resorts and public access on the north shore, though only 5% of the residential development is sewered, with septic system failures and a storm sewer system from the City of Medical Lake likely adding pollutants to the lake.

West Medical Lake. West Medical Lake, forming the western boundary of the city, is within the Upper Crab watershed, and includes approximately 4 miles of shoreline,, with an area of 220 acres and an average depth of 22 feet. One intermittent stream drains into West Medical Lake from the uplands south of Fancher Butte; otherwise, no others streams enter or exit on the Medical Lake, WA 7.5' quadrangle. Most of the inflow to West Medical Lake comes from the wastewater treatment plant (Williams and Pelletier, 1992). In wet years (e.g., 1997), this lake overflows into Clear Lake (e.g., Washington Department of Ecology, n.d.[a]). West Medical Lake receives treated wastewater from a water treatment plant thus it is very high in nutrients. Despite this high nutrient load, water is surprisingly clear. Previous researchers have identified high fecal coliform bacteria and high phosphorus loads (Smith et al, 1998). West Medical Lake is considered to be hypereutrophic (Willms and Pelletier, 1992).

Riparian and Wetland Habitat

West Medical Lake is a popular fishing lake and the zooplankton population appears to be healthy and supportive of a good sport fishery. The lake is stocked annually with rainbow trout, and was treated in 2000 to remove expanding goldfish and pumpkinseed populations. Silver Lake also is stocked with rainbow trout, though fish populations are limited by a large tench

population. Due to the lack of surface inflows and outflows, none of the three lakes support anadromous fish.

Residential development activities along both Medical Lake and Silver Lake may affect the quality of freshwater habitat through removal of upland and wetland vegetation and increasing silt, organic debris, and other stormwater contaminants that enter the natural drainage system. The greatest risk to the habitat is the conversion of the shoreline to residential uses, including the removal of riparian vegetation. In addition, stabilization methods such as shore protection structures often associated with residential development disconnect the critical ecological linkages between the water and land environments.

Due to the geological history and resulting lack of defined drainages, the region surrounding the lakes is made up of many small lakes and ponds as well as wetlands. Many of these lakes and wetlands are classified as priority wetland habitats, especially for waterfowl concentrations especially immediately south of the City of Medical Lake.

Management Measures to Protect Ecosystem-Wide Processes

- **Hydrology issues:** Permits for new development and setback legislation can be used to mitigate stormwater flows. New developments should be required to use Stormwater Best Management Practices.
- **Water quality issues** Wetlands and riparian vegetation within SMP jurisdiction can be protected to mitigate effects of upland sources. Public education on fertilizer and pesticide impacts may be useful, especially for shoreline residents. Slow runoff from construction sites with proper erosion controls. Avoid development on hydric or highly erodible soils. Work with Spokane County for coordination of shoreline and water quality management plans.
- **Riparian habitat issues:** New development can be regulated to ensure protection of riparian habitat. Use zoning and shoreline regulations to prevent encroachment of riparian and wetland habitat by new development within the SMP jurisdiction, including the use of buffers and adequate shoreline setbacks for new construction. Protect wetland and riparian vegetation within SMP jurisdiction to mitigate effects of upland non-point pollution sources, both by maintaining natural shoreline and aquatic plants as well as preventing their removal. Prevent protection of shoreline with hard structures. Work with Spokane County to control development on other portions of West Medical and Silver Lake shorelines.

Management Measures to Restore Ecosystem-Wide Processes

- **Water quality issues:** Effects on lake from upland developments can be addressed through integration with GMA planning. Direct storm runoff away from the lakes or install containment ponds. Highlight locations for most effective stormwater retrofitting. Reduce fertilizer use on agricultural, recreational and residential land near the shoreline.
- **Riparian habitat issues:** Implement a program to protect lakeside terrestrial and emergent vegetation. Retrofit shore protection structures with bioengineered approaches; restore

riparian vegetation and function. Maintain vegetative buffer along shoreline zones to help limit non-point source pollution. Maintain and enhance the biological and physical functions and values of wetlands. Provide for reasonable buffers around wetlands in order to provide a local habitat for wetland plant and animal communities, and to reduce or minimize intrusions from humans and domestic animals. Stewardship strategies should be implemented for the long-term management of wetlands. Maintain the natural value of wetlands to provide priority habitat and control and filter storm water runoff.

3. REACH INVENTORY AND ANALYSIS

SHORELNE JURISDICTION REACH BREAKS

Several sources were used to map the shoreline jurisdiction as shown on Figure 3 and synthesis maps in the map portfolio. The City of Medical Lake city and urban growth boundaries were received from Spokane County Information Systems Department via the City of Medical Lake. Each lake's ordinary high water mark shoreline was digitized from 2003 2-meter National Agricultural Imagery project color satellite imagery received from Spokane County. Associated wetland locations were mapped based on National Wetland Inventory information. For the purposes of this inventory, those wetlands assumed to be associated with shorelines (fall within 200 feet as measured from the ordinary high water mark or if they are connected to the defined shoreline environment by a surface water connection) are included in the shoreline area shown on Figure 3. To categorize distinct reaches of the City's shorelines for characterization, the shoreline jurisdiction for the three lakes was classified into nine preliminary reaches based on biophysical characteristics, as well as general land uses. Table 1 indicates the location of shoreline segments, as well as the justification for breaks between reaches. Reaches are also shown on Figure 3.

ECOLOGICAL REACH ASSESSMENTS

REACH 1

Abiotic – see Physical Synthesis Map in the Map Portfolio CD (physical.pmf)

Geology, Soils, and Hazards (Tables 2 and 3)

The surface geology of Reach 1 entirely consists of basalt flows (Washington State Department of Natural Resources [WDNR], 2000). The soils within the SMP jurisdiction are mainly Hesseltine stony silt loams (61.3%), and provide moderate permeability (SCISD 2004e). Approximately 3.4% of the area has slopes greater than 15% (U.S.Geological Survey [USGS], 2000). The floodzone covers approximately 0.7% of this reach (SCISD 2004d).

Biotic – see Biological Synthesis Map in the Map Portfolio CD (biological.pmf)

Natural Vegetation

Upland

The native vegetation of the area consists primarily of ponderosa pine (*Pinus ponderosa*)-Douglas fir (*Pseudotsuga menziesii)* eastside forest interspersed with bunchgrass "prairies" dominated by Fescue. The upland area of the jurisdiction is entirely undeveloped, though adjacent wheat fields are approximately 200 m from the shoreline.

Riparian (Table 4)
Emergent vegetation in the littoral zone is primarily restricted to narrow corridors less than 2 m wide along the shoreline, comprising 53.1% of the reach. Additional stretches of emergent vegetation 5-10 m wide along the shoreline make up another 17.9% of the reach, while 27.2% of the reach has small, isolated patches of emergent vegetation. The emergent species are dominated bulrush (*Scirpus spp.*) and broad-leaved cattail (*Typha latifolia*). The submergent species are dominated by coontail (*Ceratophyllum demersum*), sago pondweed (*Potamogeton pectinatus*), northern watermilfoil (*Myriophyllum sibiricum*), curlyleaf pondweed (*Potamogeton crispus*), and duckweed (*Lemma sp.*)(Smith et al. 1998). In addition, some large woody debris, including stumps, is found along this reach.

Wetlands (Table 4)
Wetlands make up 34.4% of the reach area, dominated by the palustrine, emergent, persistent, seasonally flooded class (United States Fish and Wildlife Service[USFWS], 2003).

Wildlife
Reach 1 may provide potential habitat for numerous terrestrial species, including 76 birds, 28 small mammals and 9 amphibians or reptiles (Table 6A) (Washington State Department of Fish and Wildlife[WDFW], 1997). These species include the Belted Kingfisher, Big Brown Bat, and Long-toed Salamander. Among these species, the Olive-sided Flycatcher, Willow Flycatcher, Townsend's Big-eared Bat, Yuma Myotis, and the Columbia Spotted Frog are current species of concern (Table 5). In addition, 49% of the jurisdiction is classified as a priority habitat for waterfowl concentrations, while another 10.1% is classified as priority wetland habitat (WDFW, 2002).

Cultural Modifications - see Cultural Modifications Synthesis Map in the Map Portfolio CD (Cultural_modifications.pmf)

Land Use (Table 7)
Of the SMP jurisdiction lands along Reach 1, 100% are classified as community (City of Medical Lake, n.d.). There are no parks located along Reach 1. A pump station serving Lakeland Village is located along this reach.

Transportation Infrastructure (Table 7)
There are no roadways or railroads within the Reach 1 SMP Jurisdiction (WDNR, 2003).

Shore Protection Structures and Docks (Table 7)
There is no shoreline protection and there are no docks along Reach 1.

Cultural Jurisdictions - see Cultural Jurisdictional Synthesis Map in the Map Portfolio CD (Cultural_jurisdictional.pmf)

Zoning (Table 8) -
Current zoning within the SMP jurisdiction of Reach 1 is predominantly institutional (90.4%), while 9.6% remains unclassified (City of Medical Lake, 1997). The existing environmental designation for Reach 1 is pastoral (URS, 2002).

Cultural Resources
There are no Archeological Site Form records of cultural sites with in the SMP jurisdiction of Reach 1 on file with the Washington State Historic Preservation Office.

DOE Facilities and 303(d) Listings
There are no DOE facilities along this reach. West Medical Lake has been listed as a 303(d) lake for ammonia and fecal coliform issues (Washington State Department of Ecology [DOE], 1998).

Ecological Function Summary

Table 9. Reach 1 Shoreline Characterization Summary

Hazard Potential	Habitat Conditions	Public Access	Key Modifications
Floodzone: 0.7% Erodible soils: 0.2% Steep slopes: 3.4%	Wetlands: 34.4% Priority habitats: 2 Species of concern: 5		Principal land use: Community Pump station: 1

Ecological functions on Reach 1 are relatively intact. The shoreline within this reach is primarily natural and undeveloped, providing potential habitat for a wide variety of wildlife and fish species. The riparian vegetation is diverse and well established, providing bank stability and sources of large woody debris. Agricultural development, occurring approximately 200 meters back from the shore, is a potential source of nonpoint pollution such as sediment, fertilizers and pesticides.

Opportunities For Ecological Protection And Restoration - see Opportunities Map in the Map Portfolio CD (Opportunities.pmf)

Opportunity A: Little or no development and shoreline modifications in wetland and riparian areas offer opportunities for enhancement and protection, including conservation of critical wildlife habitat such as nesting sites and foraging areas. This riparian vegetation also helps buffer the lake from nonpoint sources of pollution from the upland agricultural land use.

REACH 2

Abiotic – see Physical Synthesis Map in the Map Portfolio CD (physical.pmf)

Geology, Soils and Hazards (Tables 2 and 3)
The surface geology of Reach 2 entirely consists of basalt flows (WDNR, 2002). The soils within the SMP jurisdiction are mainly Hesseltine stony silt loams (71.3%) (SCISD, 2004e). Approximately 3.9% of the area has slopes greater than 15% (USGS, 2000). This reach is not affected by the floodzone (SCISD, 2004d).

Biotic – see Biological Synthesis Map in the Map Portfolio CD (biological.pmf)

Natural Vegetation
Upland
The native vegetation of the area primarily consists of ponderosa pine (*Pinus ponderosa*), Douglas fir (*Pseudotsuga menziesii)* eastside forest interspersed with bunchgrass "prairies" dominated by Fescue wheatgrass. The natural vegetation has been heavily modified by the recreational land uses found within the jurisdiction.

Riparian (Table 4)
Emergent vegetation in the littoral zone is primarily restricted to narrow corridors approximately 2 m wide along the shoreline, comprising 17.9% of the reach. Additional stretches of emergent vegetation less than 2 m wide along the shoreline make up another 13.9% of the reach. The emergent species are dominated bulrush (*Scirpus spp.*). The submergent species are dominated by coontail (*Ceratophyllum demersum*), sago pondweed (*Potamogeton pectinatus*), northern watermilfoil (*Myriophyllum sibiricum*), curlyleaf pondweed (*Potamogeton crispus*), and duckweed (*Lemma sp.*)(Smith et al., 1998).

Wetlands (Table 4)
Wetlands are found in 11.3% the SMP jurisdiction, dominated by the palustrine, emergent, persistent, seasonally flooded class (USFWS, 2003).

Wildlife
Reach 2 may provide potential habitat for numerous terrestrial species, including 76 birds, 28 small mammals and 9 amphibians or reptiles (Table 6A) (WDFW, 1997). These species include the Belted Kingfisher, Big Brown Bat, and Long-toed Salamander. Among these species, the Olive-sided Flycatcher, Willow Flycatcher, Townsend's Big-eared Bat, Yuma Myotis, and the Columbia Spotted Frog are current species of concern (Table 5). In addition, 83.9% of the jurisdiction is classified as a priority wetland habitat (WDFW, 2002).
Cultural Modifications - see Cultural Modifications Synthesis Map in the Map Portfolio CD (Cultural_modifications.pmf)

Land Use (Table 7)
Of the SMP jurisdiction lands along Reach 2, 90.9% are classified as Community and 9.1% remains unclassified (City of Medical Lake, n.d.). There are no public parks located along this reach. Impervious surfaces comprise 32.2% of the area in Reach 2.

Transportation Infrastructure (Table 7)
Roadways occupy 0.2 km of SMP jurisdiction land in Reach 2 (WDNR, 2003).

Shore Protection Structures and Docks (Table 7)
Approximately 8.3% of the shoreline along Reach 2 is protected by shore protection structures. In addition, 2 docks and 2 boat launches (one private and one public) are located along this reach.

Cultural Jurisdictions - see Cultural Jurisdictional Synthesis Map in the Map Portfolio CD (Cultural_jurisdictional.pmf)

Zoning (Table 8)
Current zoning within the SMP jurisdiction of Reach 2 is principally institutional (90.9%) while 9.1% remains unclassified (City of Medical Lake, 1997). Currently the existing environmental designation for Reach 2 is classified entirely as conservancy (URS, 2002).

Cultural Resources
There are no Archeological Site Form records of cultural sites with in the SMP jurisdiction of Reach 2 on file with the Washington State Historic Preservation Office.

DOE Facilities and 303(d) Listings
There are no DOE facilities along this reach. West Medical Lake has been listed as a 303(d) lake for ammonia and fecal coliform issues (DOE, 1998).

Ecological Function Summary

Table 10. Reach 2 Shoreline Characterization Summary

Hazard Potential	Habitat Conditions	Public Access	Key Modifications
Steep soils: 3.9%	Wetlands: 11.3% Priority habitats: 1 Species of concern: 5	Boat launches: 2	Principal land use: Community Imperviousness: 32.2% Roads: 0.2 km Bulkheads: 8.1%

Ecological functions on Reach 2 have been impaired by heavy recreational use stemming from a public boat launch and private boat launch/fishing dock. The riparian vegetation along this

shoreline has been largely modified and removed, while approximately 8% of the shoreline is also hardened with shoreline protection. The highway is another potential source of nonpoint pollution.

Opportunities For Ecological Protection And Restoration – see Opportunities Map in the Map Portfolio CD (Opportunities.pmf)

Opportunity A: Further shoreline hardening should be prevented to minimize adverse effects on the shoreline. Through removing existing structures and preventing more shoreline protection, less damage would occur to the natural shoreline processes. The removed structures could possibly be replaced with bioengineered approaches, particularly on the public boat launch. This could coincide with encouragement of planting native vegetation riparian buffers and limiting clearing and disturbance on both the publicly and privately-owned recreational properties.

Opportunity B: Stormwater diversions or containment ponds could be used to protect the nearshore habitat from nonpoint pollution runoff from the neighboring highway.

REACH 3

Abiotic – see Physical Synthesis Map in the Map Portfolio CD (physical.pmf)

Geology, Soils and Hazards (Tables 2 and 3)
The geology of Reach 3 consists of basalt flows (72.2%) and granodiorite (27.8%) (WDNR, 2000). The soils within the SMP jurisdiction are mainly Bong coarse sandy loam (63.8%) (SCISD, 2004e). Approximately 23.1% of the area has slopes greater than 15% (USGS, 2000). The floodzone covers approximately 7.7% of this reach (SCISD, 2004d).

Biotic – see Biological Synthesis Map in the Map Portfolio CD (biological.pmf)

Natural Vegetation
Upland
The native vegetation of the area primarily consists of ponderosa pine (*Pinus ponderosa*)-Douglas fir (*Pseudotsuga menziesii)* eastside forest interspersed with bunchgrass "prairies" dominated by Fescue wheatgrass. The natural vegetation is largely unmodified within the jurisdiction, with the exception of a small lawn area associated with a private picnic area belonging to Eastern State Hospital and Lakeland Village.

Riparian (Table 4)
Emergent vegetation in the littoral zone is primarily found in sections of emergent vegetation over 10 m wide, comprising 20.8% of the reach. Other emergent vegetation is restricted to small, isolated patches of emergent vegetation, making up another 16.7% of the reach. The emergent

species are dominated bulrush (*Scirpus spp.*), broad-leaved cattail (*Typha latifolia*), and reed canary *grass (Phalaris arundacia*). The submergent species are dominated by coontail (*Ceratophyllum demersum*), sago pondweed (*Potamogeton pectinatus*), northern watermilfoil (*Myriophyllum sibiricum*), curlyleaf pondweed (*Potamogeton crispus*), and duckweed (*Lemma sp.*)(Smith et al., 1998). In addition, extensive large woody debris, including stumps, is found along much of the reach.

Wetlands (Table 4)
Wetlands are found in 1.7% of the SMP jurisdiction, dominated by the palustrine, emergent, persistent, seasonally flooded class (USFWS, 2003).

Wildlife
Reach 3 may provide potential habitat for numerous terrestrial species, including 76 birds, 28 small mammals and 9 amphibians or reptiles (Table 6A) (WDFW, 1997). These species include the Belted Kingfisher, Big Brown Bat, and Long-toed Salamander. Among these species, the Olive-sided Flycatcher, Willow Flycatcher, Townsend's Big-eared Bat, Yuma Myotis, and the Columbia Spotted Frog are current species of concern (Table 5). An osprey nest is listed as a Natural Heritage site along this reach (WDFW, 2002). In addition, 60.4% of the jurisdiction is classified as a priority wetland habitat.

Cultural Modifications - see Cultural Modifications Synthesis Map in the Map Portfolio CD (Cultural_modifications.pmf)

Land Use (Table 7)
Of the SMP jurisdiction lands along Reach 3, 100% is classified as community (City of Medical Lake, n.d.). A former quarry comprises 4.2% of the area, while a former dump is also located along the shoreline. A pump station and sewage outfall is located along this reach. There are no public parks located along this reach, though there is a private picnic area belonging to Eastern State Hospital and Lakeland Village, complete with a small dock.

Transportation Infrastructure (Table 7)
Roadways occupy 0.5 km of SMP jurisdiction land in Reach 3 (WDNR, 2003).

Shore Protection Structures and Docks (Table 7)
None of the shoreline along Reach 3 is protected by shore protection structures. In addition, 1 private dock is located along this reach.

Cultural Jurisdictions - see Cultural Jurisdictional Synthesis Map in the Map Portfolio CD (Cultural_jurisdictional.pmf)

Zoning (Table 8)

Current zoning within the SMP jurisdiction of Reach 3 is classified as institutional (92.2%) and unclassified (7.8%) (City of Medical Lake, 1997). The current environmental designation for Reach 3 is pastoral (URS, 2002).

Cultural Resources
There are no Archeological Site Form records of cultural sites with in the SMP jurisdiction of Reach 3 on file with the Washington State Historic Preservation Office.

DOE Facilities and 303(d) Listings
There are no DOE facilities along this reach. West Medical Lake has been listed as a 303(d) lake for ammonia and fecal coliform issues (DOE, 1998).

Ecological Function Summary

Table 11. Reach 3 Shoreline Characterization Summary

Hazard Potential	Habitat Conditions	Public Access	Key Modifications
Floodzone: 7.7% Steep slopes: 23.1%	Wetlands:1.7 % Priority habitats: 1 Species of concern: 4		Principal land use: Community Roads: 0.5 km Pump station: 1 Sewage outfall:1

Ecological functions on Reach 3 are relatively intact. The shoreline within this reach is primarily natural and undeveloped, providing potential habitat for a wide variety of wildlife and fish species. The riparian vegetation, dominated by extensive wetlands, is diverse and well established, providing bank stability and sources of large woody debris. The natural vegetation is largely unmodified within the jurisdiction, with the exception of a small lawn area associated with a private dock and picnic area. A former dump is located along the shoreline, with debris such as old cans, tires, barrels, and car parts spilling into the nearshore.

Opportunities For Ecological Protection And Restoration – see Opportunities Map in the Map Portfolio CD (Opportunities.pmf)

Opportunity A: Little or no development and shoreline modifications in wetland and riparian areas offer opportunities for enhancement and protection, including conservation of critical wildlife habitat such as nesting sites and foraging areas. Critical habitat can be preserved by purchasing development rights or the title for resource conservancy parks.

Opportunity B: Work with the Eastern State Hospital to restore a native riparian vegetation buffer along its shoreline picnic area.

Opportunity C: Work with the Eastern State Hospital to clean up the old dump area.

REACH 4

Abiotic – see Physical Synthesis Map in the Map Portfolio CD (physical.pmf)

Geology, Soils and Hazards (Tables 2 and 3)
The surface geology of Reach 4 entirely consists of granodiorite (WDNR, 2000). The soils within the SMP jurisdiction are mainly Dragoon very rocky complex (98.2%). Erodible soils cover 44.5% of the reach (SCISD, 2004e). Approximately 3.5% of the area has slopes greater than 15% (USGS, 2000). The floodzone covers approximately 7.1% of this reach (SCISD, 2004d).

Biotic – see Biological Synthesis Map in the Map Portfolio CD (biological.pmf)

Natural Vegetation
Upland
The native vegetation of the area primarily consists of ponderosa pine (*Pinus ponderosa*)-Douglas fir (*Pseudotsuga menziesii)* eastside forest interspersed with bunchgrass "prairies" dominated by Fescue wheatgrass. The natural vegetation is largely unmodified in the jurisdiction.

Riparian (Table 4)
Emergent aquatic vegetation in the littoral zone is primarily restricted to small, isolated patches of emergent vegetation along a bedrock shoreline, comprising 51.1% of the reach. Another stretch of emergent vegetation over 10 m wide makes up another 34.6% of the reach shoreline. The emergent species are dominated bulrush (*Scirpus spp.*) and broad-leaved cattail (*Typha latifolia*). The submergent species are dominated by coontail (*Ceratophyllum demersum*), sago pondweed (*Potamogeton pectinatus*), northern watermilfoil (*Myriophyllum sibiricum*), curlyleaf pondweed (*Potamogeton crispus*), and duckweed (*Lemma sp.*)(Smith et al., 1998).

Wetlands (Table 4)
Wetlands cover approximately 4.9% of Reach 4, dominated by the palustrine, aquatic bed, floating vascular, permanently flooded class (USFWS, 2003).

Wildlife
Reach 4 may provide potential habitat for numerous terrestrial species, including 76 birds, 28 small mammals and 9 amphibians or reptiles (Table 6A) (WDFW, 1997). These species include the Belted Kingfisher, Big Brown Bat, and Long-toed Salamander. Among these species, the Olive-sided Flycatcher, Willow Flycatcher, Townsend's Big-eared Bat, Yuma Myotis, and the Columbia Spotted Frog are current species of concern (Table 5). In addition, 57.5% of the jurisdiction is classified as a priority wetland habitat (WDFW, 2002).

Cultural Modifications - see Cultural Modifications Synthesis Map in the Map Portfolio CD (Cultural_modifications.pmf)

Land Use (Table 7)
Of the SMP jurisdiction lands along Reach 4, 100% are classified as community (City of Medical Lake, n.d.). A former quarry comprises 2.4% of the area. There are no parks located along this reach.

Transportation Infrastructure (Table 7)
Roadways occupy 0.5 km of SMP jurisdiction land in Reach 4 (WDNR, 2003).

Shore Protection Structures and Docks (Table 7)
There are no shore protection structures or docks located along Reach 4.

Cultural Jurisdictions - see Cultural Jurisdictional Synthesis Map in the Map Portfolio CD (Cultural_jurisdictional.pmf)

Zoning (Table 8)
Current zoning within the SMP jurisdiction of Reach 4 is entirely institutional (City of Medical Lake, 1997). The current environmental designation for Reach 4 is pastoral (URS, 2002).

Cultural Resources
There are no Archeological Site Form records of cultural sites with in the SMP jurisdiction of Reach 4 on file with the Washington State Historic Preservation Office.

DOE Facilites and 303(d) Listings
There are no DOE facilities along this reach. West Medical Lake has been listed as a 303(d) lake for ammonia and fecal coliform issues (DOE, 1998).

Ecological Function Summary

Table 12. Reach 4 Shoreline Characterization Summary

Hazard Potential	Habitat Conditions	Public Access	Key Modifications
Floodzone: 7.1% Erodible soils: 44.5% Steep slopes: 3.5%	Wetlands: 4.9% Priority habitats: 2 Species of concern: 5		Principal land use: Community Roads: 0.5 km

Ecological functions on Reach 4 are relatively intact. The shoreline within this reach is primarily natural and undeveloped, providing potential habitat for a wide variety of wildlife and fish species. The riparian vegetation, including extensive wetlands, is diverse and well established, providing bank stability and sources of large woody debris. The natural vegetation is largely unmodified within the jurisdiction.

Opportunities For Ecological Protection And Restoration – see Opportunities Map in the Map Portfolio CD (Opportunities.pmf)

Opportunity A: Little or no development and shoreline modifications in wetland and riparian areas offer opportunities for enhancement and protection, including conservation of critical wildlife habitat such as nesting sites and foraging areas. Critical habitat can be preserved by purchasing development rights or the title for resource conservancy parks.

REACH 5

Abiotic – see Physical Synthesis Map in the Map Portfolio CD (physical.pmf)

Geology, Soils and Hazards (Tables 2 and 3)

The geology of Reach 5 predominantly consists of granodiorite (77.3%) (WDNR, 2000). The soils within the SMP jurisdiction are mainly Dragoon very rocky complex (87.4%). Erodible soils cover 77.5% of the reach (SCISD, 2004e). Approximately 28.7% of the area has slopes greater than 15% (USGS, 2000). The floodzone does not cover this reach (SCISD, 2004d).

Biotic – see Biological Synthesis Map in the Map Portfolio CD (biological.pmf)

Natural Vegetation

Upland

The native vegetation of the area primarily consists of ponderosa pine (*Pinus ponderosa*)-Douglas fir (*Pseudotsuga menziesii)* eastside forest interspersed with bunchgrass "prairies" dominated by Fescue wheatgrass. The native vegetation has been modified by recreational use, though is largely intact.

Riparian (Table 4)

Emergent vegetation in the littoral zone is primarily restricted to narrow corridors less than 2 m wide along the shoreline, comprising 53.4% of the reach. The emergent species are dominated bulrush (*Scirpus spp.*), broad-leaved cattail (*Typha latifolia*), and ditch-grass (*Ruppie maritime*). The submergent species are dominated by northern watermilfoil (*Myriophyllum sibiricum*), sago pondweed (*Potamogeton pectinatus*), and water-crowfeet (*Ranunculus aquatillis*). Eurasian watermilfoil (*Myriophyllum spicatum*), an exotic species, has also invaded the lake.

Wetlands (Table 4)

Wetlands are found in 40.6% of the SMP jurisdiction, dominated by the palustrine, emergent, persistent, semi-permanently flooded class (USFWS, 2003).

Wildlife

Reach 5 may provide potential habitat for numerous terrestrial species, including 77 birds, 29 small mammals and 9 amphibians or reptiles (Table 6B) (WDFW, 1997). These species include the Belted Kingfisher, Big Brown Bat, and Long-toed Salamander. Among these species, the Olive-sided Flycatcher, Willow Flycatcher, Townsend's Big-eared Bat, Yuma Myotis, and the Columbia Spotted Frog are current species of concern (Table 5). In addition, 15.9% of the jurisdiction is classified as a priority wetland habitat, associated with waterfowl concentrations

during migration and breeding, Great Blue Heron nesting and foraging, furbearer use, and presence of Tiger Salamander and Painted Turtles.

Cultural Modifications - see Cultural Modifications Synthesis Map in the Map Portfolio CD (Cultural_modifications.pmf)

Land Use (Table 7)
Of the SMP jurisdiction lands along Reach 5, 68.3% are classified as community, 21% are vacant land, and 1.2% remains unclassified (City of Medical Lake, n.d.). Approximately 43.1% of the reach is public land, including North End Park and portions of the public biking/walking which follows the western shoreline of the lake southward to Waterfront Park. North End Park is a small two-acre park consisting primarily of open space with areas for picnicking and viewing the lake (City of Medical Lake, 1997). The trail system, encompassing approximately ten acres, also includes a series of picnic and viewing sites. Impervious surfaces comprise 2.7% of the area in Reach 5.

Transportation Infrastructure (Table 7)
Roadways occupy 0.8 km of SMP jurisdiction land in Reach 5 (WDNR, 2003).

Shore Protection Structures and Docks (Table 7)
Approximately 3.6% of the shoreline along Reach 5 is protected by shore protection structures. In addition, 1 dock is located along this reach.

Cultural Jurisdictions - see Cultural Jurisdictional Synthesis Map in the Map Portfolio CD (Cultural_jurisdictional.pmf)

Zoning (Table 8)
Current zoning within the SMP jurisdiction of Reach 5 is principally institutional (85.2%) and single family residential (4.2%), while the rest is unclassified (City of Medical Lake, 1997). The existing environmental designation for Reach 5 is conservancy (URS, 2002).

Cultural Resources
There are no Archeological Site Form records of cultural sites with in the SMP jurisdiction of Reach 5 on file with the Washington State Historic Preservation Office.

DOE Facilities and 303(d) Listings
There are no DOE facilities along this reach. Medical Lake has been listed as a 303(d) lake for total phosphorus issues (DOE, 1998).

Ecological Function Summary

Table 13. Reach 5 Shoreline Characterization Summary

Hazard Potential	Habitat Conditions	Public Access	Key Modifications
Erodible soils: 77.5%	Wetlands: 40.6%	Park land: 43.1%	Principal land use:

Steep slopes: 28.7	Priority habitats: 2 Species of concern: 5		Community Imperviousness: 2.7% Roads: 0.8 km Bulkheads: 3.6% Docks: 1

Ecological functions on Reach 5 are relatively intact. The shoreline within this reach is primarily natural and undeveloped, providing potential habitat for a wide variety of wildlife and fish species. The riparian vegetation, dominated by a riparian wetland, is diverse and well established, providing much needed bank stability in an area of erodible soils, as well as sources of large woody debris. The natural vegetation is largely unmodified within the jurisdiction, with the exception of a small lawn area associated with a public dock and picnic area. The highway is another potential source of nonpoint pollution.

Opportunities For Ecological Protection And Restoration – see Opportunities Map in the Map Portfolio CD (Opportunities.pmf)

Opportunity A: Little or no development and shoreline modifications in wetland and riparian areas offer opportunities for enhancement and protection, including conservation of critical wildlife habitat such as nesting sites and foraging areas. Critical habitat can be preserved by purchasing development rights or the title for resource conservancy parks.

Opportunity B: Work with the City of Medical Lake to restore a native riparian vegetation buffer along its shoreline picnic area.

Opportunity C: Little or no development and shoreline modifications in wetland and riparian areas offer opportunities for enhancement and protection, including conservation of critical wildlife habitat such as nesting sites and foraging areas. Critical habitat can be preserved by purchasing development rights or the title for resource conservancy parks.

REACH 6

Abiotic – see Physical Synthesis Map in the Map Portfolio CD (physical.pmf)

Geology, Soils and Hazards (Tables 2 and 3)
The geology for Reach 6 consists of granodiorite (64%) and basalt flows (36%) (WDNR, 2000). The soils within the SMP jurisdiction are mainly Bong coarse sandy loam (51.6%) (SCISD, 2004e). Approximately 36.4% of the area has slopes greater than 15% (USGS, 2000). The floodzone does not cover this reach (SCISD, 2004d).

Biotic – see Biological Synthesis Map in the Map Portfolio CD (biological.pmf)

Natural Vegetation

Upland
The native vegetation of the area primarily consists of ponderosa pine (*Pinus ponderosa*)-Douglas fir (*Pseudotsuga menziesii)* eastside forest interspersed with bunchgrass "prairies" dominated by Fescue wheatgrass. The natural vegetation has been heavily modified by recreational facilities at the south end of the lake, though is largely intact throughout most of the reach.

Riparian (Table 4)
Emergent vegetation in the littoral zone is primarily found in corridors between 2-5 m wide along the shoreline, comprising 20% of the reach. Additional stretches of emergent vegetation less than 2 m wide along the shoreline make up another 6.7% of the reach, while 5.9% of the reach has small, isolated patches of emergent vegetation along bedrock shorelines. The emergent species are dominated bulrush (*Scirpus spp.*) and broad-leaved cattail (*Typha latifolia*). The submergent species are dominated by northern watermilfoil (*Myriophyllum sibiricum*), sago pondweed (*Potamogeton pectinatus*), and water-crowfeet (*Ranunculus aquatillis*)(Smith et al. 1998). Eurasian watermilfoil (*Myriophyllum spicatum*), an exotic species, has also invaded the lake. In addition, large woody debris is found along much of the reach.

Wetlands (Table 4)
Wetlands are found in 6.3% of the SMP jurisdiction, dominated by the palustrine, emergent, persistent, seasonally flooded class (USFWS, 2003). In addition, 26.7% of the jurisdiction is classified as a priority wetland habitat, associated with waterfowl concentrations during migration and breeding, Great Blue Heron nesting and foraging, furbearer use, and presence of Tiger Salamander and Painted Turtles (WDFW, 2002).

Wildlife
Reach 6 may provide potential habitat for numerous terrestrial species, including 77 birds, 29 small mammals and 9 amphibians or reptiles (Table 6B) (WDFW, 1997). These species include the Belted Kingfisher, Big Brown Bat, and Long-toed Salamander. Among these species, the Olive-sided Flycatcher, Willow Flycatcher, Townsend's Big-eared Bat, Yuma Myotis, and the Columbia Spotted Frog are current species of concern (Table 5).

Cultural Modifications - see Cultural Modifications Synthesis Map in the Map Portfolio CD (Cultural_modifications.pmf)

Land Use (Table 7)
Of the SMP jurisdiction lands along Reach 6, 100% is community (City of Medical Lake, n.d.). Approximately 79.1% of the reach is public land, including Waterfront Park and portions of the public biking/walking which follows the western shoreline of the lake northward to North End Park. The Waterfront Park facilities, which encompass 45 acres and over one mile of shoreline, include picnic areas, a swimming beach, play fields, and an unimproved boat launch (City of Medical Lake, 1997). The trail system, encompassing approximately ten acres, also includes a series of picnic and viewing sites. Impervious surfaces comprise 3.1% of the area in Reach 6.

Transportation Infrastructure (Table 7)
Roadways occupy 1.0 km of SMP jurisdiction land in Reach 6 (WDNR, 2003).

Shore Protection Structures and Docks (Table 7)
None of the shoreline along Reach 6 is protected by shore protection structures.

Cultural Jurisdictions - see Cultural Jurisdictional Synthesis Map in the Map Portfolio CD (Cultural_jurisdictional.pmf)

Zoning (Table 8)
Current zoning within the SMP jurisdiction of Reach 6 is predominately institutional (80.9%) with 19.1% unclassified (City of Medical Lake, 1997). The existing environmental designation for Reach 6 is conservancy (URS, 2002).

Cultural Resources
There are no Archeological Site Form records of cultural sites with in the SMP jurisdiction of Reach 6 on file with the Washington State Historic Preservation Office.

DOE Facilities and 303(d) Listings
There are no DOE facilities along this reach. Medical Lake has been listed as a 303(d) lake for total phosphorus issues (DOE, 1998).

Ecological Function Summary

Table 14. Reach 6 Shoreline Characterization Summary

Hazard Potential	Habitat Conditions	Public Access	Key Modifications
Steep slopes: 36.4%	Wetlands: 6.3% Priority habitats: 1 Species of concern: 5	Park land: 79.1% Boat launches: 1	Principal land use: Community Imperviousness: 3.1% Roads: 1 km

Ecological functions on Reach 6 are relatively intact. The shoreline within this reach is primarily natural and undeveloped, providing potential habitat for a wide variety of wildlife and fish species. The riparian vegetation is diverse and well established, providing bank stability, as well as sources of large woody debris. The natural vegetation is largely unmodified within the jurisdiction on the east side of the lake, with the exception of a walking /biking trail that surrounds the lake. The natural vegetation in the southern end of the lake has been moderately impacted by recreational use, including a small lawn area and swimming beach associated with Waterfront Park, and vehicular and pedestrian access to an unimproved boat launch at the south end of the lake. The neighboring highway is a potential source of nonpoint source pollution.

Opportunities For Ecological Protection And Restoration – see Opportunities Map in the Map Portfolio CD (Opportunities.pmf)

Opportunity A: Little or no development and shoreline modifications in wetland and riparian areas offer opportunities for enhancement and protection, including conservation of critical wildlife habitat such as nesting sites and foraging areas. Critical habitat can be preserved by purchasing development rights or the title for resource conservancy parks.

Opportunity B: Work with the City of Medical Lake to restore a native riparian vegetation buffer along its shoreline picnic area.

Opportunity C: As motorized boats are not allowed on the lake, the City of Medical Lake could restrict vehicular access to the unimproved boat launch, as well as establish marked trails to the shoreline to reduce the trampling of native vegetation by the extensive network of informal trails that has developed along the shoreline in this area.

Opportunity D: Stormwater diversions or containment ponds could be used to protect the nearshore habitat from nonpoint pollution runoff from the neighboring highway.

REACH 7

Abiotic – see Physical Synthesis Map in the Map Portfolio CD (physical.pmf)

Geology, Soils and Hazards (Tables 2 and 3)
The geology of Reach 7 entirely consists of basalt flows (WDNR, 2000). The soils within the SMP jurisdiction are almost entirely Hesseltine stony silt loam (SCISD, 2004e). The floodzone does not cover this reach (SCISD, 2004d).

Biotic – see Biological Synthesis Map in the Map Portfolio CD (biological.pmf)

Natural Vegetation
Upland
The native vegetation of the area primarily consists of ponderosa pine (*Pinus ponderosa*)-Douglas fir (*Pseudotsuga menziesii)* eastside forest interspersed with bunchgrass "prairies" dominated by Fescue wheatgrass. The natural vegetation has been heavily modified by a combination of largely residential and recreational land uses throughout the reach.

Riparian (Table 4)
Emergent vegetation in the littoral zone is primarily restricted to corridors between 2-5 m wide along the bedrock shoreline, comprising 11% of the reach. The rest of the emergent vegetation is restricted to narrow corridors less than 2 m in width (9.1%). The emergent species are dominated bulrush (*Scirpus spp.*), broad-leaved cattail (*Typha latifolia*), and ditch-grass (*Ruppie maritime*). The submergent species are dominated by northern watermilfoil (*Myriophyllum*

sibiricum), sago pondweed (*Potamogeton pectinatus*), and water-crowfeet (*Ranunculus aquatillis*)(Smith et al., 1998). Eurasian watermilfoil (*Myriophyllum spicatum*), an exotic species, has also invaded the lake.

Wetlands (Table 4)
Wetlands are not found in the SMP jurisdiction (USFWS, 2003).

Wildlife
Reach 7 may provide potential habitat for numerous terrestrial species, including 77 birds, 29 small mammals and 9 amphibians or reptiles (Table 6B) (WDFW, 1997). These species include the Belted Kingfisher, Big Brown Bat, and Long-toed Salamander. Among these species, the Olive-sided Flycatcher, Willow Flycatcher, Townsend's Big-eared Bat, Yuma Myotis, and the Columbia Spotted Frog are current species of concern (Table 5).

Cultural Modifications - see Cultural Modifications Synthesis Map in the Map Portfolio CD (Cultural_modifications.pmf)

Land Use (Table 7)
Of the SMP jurisdiction lands along Reach 7, 38.1% are classified as single family residential, 15.6% are classified as vacant land, 12.5% are community, 2.5% unclassified, 2.2% 2-4 dwelling units, and 1% manufactured homes (City of Medical Lake, n.d.). This reach also contains public lands (17%), including Coney Island and Peper Parks. Coney Island Park, approximately one acre in size, is adjacent to the downtown area (City of Medical Lake, 1997). The site is an important linkage to recreation and the lake from the Central Business District. In the recent past, it had a public boat dock and moorage for 6 boats. Peper Park facilities cover approximately 1 acre, and include six picnic tables, access to the lake shoreline trail, a boat ramp and moorage for six boats. Peper Park is also linked to the city trail system. Impervious surfaces comprise 15.4% of the area in Reach 7.

Transportation Infrastructure (Table 7)
Roadways occupy 1.3 km of SMP jurisdiction land in Reach 7 (WDNR, 2003). There are also two stormwater drains located along this reach.

Shore Protection Structures and Docks (Table 7)
Approximately 12% of the shoreline along Reach 7 is protected by shore protection structures. In addition, 20 docks are located along this reach.

Cultural Jurisdictions - see Cultural Jurisdictional Synthesis Map in the Map Portfolio CD (Cultural_jurisdictional.pmf)

Zoning (Table 8)
Current zoning within the SMP jurisdiction of Reach 7 is principally single family residential (55.5%), followed by institutional (12.5%), multi-family residential (0.7%) (City of Medical Lake,

1997). Approximately 3.1% of the reach is not zoned. The existing environmental designation for Reach 7 is urban.

Cultural Resources
There are no Archeological Site Form records of cultural sites with in the SMP jurisdiction of Reach 7 on file with the Washington State Historic Preservation Office.

DOE Facilities and 303(d) Listings
There are no DOE facilities along this reach. Medical Lake has been listed as a 303(d) lake for total phosphorus issues (DOE, 1998).

Ecological Function Summary

Table 15. Reach 7 Shoreline Characterization Summary

Hazard Potential	Habitat Conditions	Public Access	Key Modifications
Steep slopes: 8.7%	Species of concern: 5	Park land: 17%	Principal land use: Single family residential Imperviousness: 15.4% Roads: 1.3 km Bulkheads: 17.7% Docks: 20 Storm drains: 1

Ecological functions along Reach 7 are moderately impaired by residential development. Riparian vegetation has been removed and replaced with lawns, which can promote increased runoff and nonpoint pollution. Impervious surfaces, such as residential roads and buildings, can promote runoff and nonpoint source pollution. Extensive shoreline hardening has increased wave reflectivity, thereby affecting aquatic vegetation and fish habitat. This habitat is further impaired by the fairly large number of docks found in this reach.

Opportunities For Ecological Protection And Restoration – see Opportunities Map in the Map Portfolio CD (Opportunities.pmf)

Opportunity A: Further shoreline hardening should be prevented to minimize adverse effects on the shoreline. Through removing existing structures and preventing more shoreline protection, less damage would occur to the natural shoreline processes. The removed structures could possibly be replaced with bioengineered approaches, particularly at Coney Island Park. This could coincide with encouragement of planting native vegetation and limiting clearing and disturbance on privately-owned residential properties with shoreline frontage.

Opportunity B: Reduce the proliferation of docks, perhaps by replacing them with a community dock.

Opportunity C: Work with the City of Medical Lake to restore a native riparian vegetation buffers along its two shoreline parks.

REACH 8

Abiotic – see Physical Synthesis Map in the Map Portfolio CD (physical.pmf)

Geology, Soils and Hazards (Tables 2 and 3)
The geology of Reach 8 predominantly consists of metasedimentary rock deposits (52.7%) (WDNR, 2000). The soils within the SMP jurisdiction are mainly Cocolalla silty clay loam (31.1%), while another 18% of the jurisdiction has fresh water marsh soils. Erodible soils cover 18.6% of the reach area (SCISD, 2004e). Approximately 5.1% of the area has slopes greater than 15% (USGS, 2000). Being relatively flat and low-lying, the floodzone covers approximately 74.9% of this reach (SCISD, 2004d).

Biotic – see Biological Synthesis Map in the Map Portfolio CD (biological.pmf)

Natural Vegetation
Upland
The native vegetation of the area primarily consists of ponderosa pine (*Pinus ponderosa*)-Douglas fir (*Pseudotsuga menziesii)* eastside forest interspersed with bunchgrass "prairies" dominated by Fescue wheatgrass. The natural vegetation has been modified by a combination of residential and agricultural land uses throughout the reach.

Riparian (Table 4)
Emergent vegetation in the littoral zone is approximately 2-5 m wide along most of the shoreline (86.7%). The emergent species are dominated by bulrush (*Scirpus spp.*) and broad-leaved cattail (*Typha latifolia*). The submergent species include Canadian waterweed (*Elodea canadensis*), northern watermilfoil (*Myriophyllum sibiricum*), sago pondweed (*Potamogeton pectinatus*), curl-leaf pondweed (*Potamogeton crispus*), coontail (*Ceratophyylum demersum*), and muskwort (*Chara sp.*)(Smith et al., 1998). Eurasian watermilfoil (*Myriophyllum spicatum*), an exotic species, has also invaded the lake.

Wetlands (Table 4)
Wetlands are found in 60.7% of the SMP jurisdiction, dominated by the palustrine, emergent, persistent, seasonally flooded class (USFWS, 2003).

Wildlife
Reach 8 may provide potential habitat for numerous terrestrial species, including 78 birds, 29 small mammals and 9 amphibians or reptiles (Table 6C) (WDFW, 1997). These species include the Belted Kingfisher, Big Brown Bat, and Long-toed Salamander. Among these species, the

Olive-sided Flycatcher, Willow Flycatcher, Townsend's Big-eared Bat, Yuma Myotis, and the Columbia Spotted Frog are current species of concern (Table 5). In addition, 94% of the jurisdiction is classified as a priority wetland habitat, associated with waterfowl concentrations of Mallard, Wigeon, Pintail, Cinnamon Teal, and Redhead Northern Shoveler(WDFW, 2002).

Cultural Modifications - see Cultural Modifications Synthesis Map in the Map Portfolio CD (Cultural_modifications.pmf)

Land Use (Table 7)
Of the SMP jurisdiction lands along Reach 8, 86.5% are vacant, 5.7% are classified single family residential, 3.3% is classified retail, and 3.2% are manufactured homes (City of Medical Lake, n.d.). There are no parks located along this reach. Impervious surfaces comprise 2.0% of the area in Reach 8.

Transportation Infrastructure (Table 7)
Roadways occupy 0.4 km of SMP jurisdiction land in Reach 8 (WDNR, 2003). The road causeway is another potential source of nonpont pollution. The causeway also cuts of the relatively shallower, northern end of the lake from large-scale circulation patterns, thereby allowing the buildup of nutrients and increased eutrophication.

Shore Protection Structures and Docks (Table 7)
There are no shore protection structures or docks along this reach.

Cultural Jurisdictions - see Cultural Jurisdictional Synthesis Map in the Map Portfolio CD (Cultural_jurisdictional.pmf)

Zoning (Table 8)
Current county zoning within the SMP jurisdiction of Reach 8 is entirely rural conservation (100.0%) (City of Medical Lake, 1997). The existing environmental designation for Reach 8 is pastoral (URS 2002).

Cultural Resources
There are no Archeological Site Form records of cultural sites with in the SMP jurisdiction of Reach 8 on file with the Washington State Historic Preservation Office.

DOE Facilities and 303(d) Listings
There are no DOE facilities along this reach and Silver Lake is not listed as a 303(d) lake (DOE, 1998).

Ecological Function Summary

Table 16. Reach 8 Shoreline Characterization Summary

Hazard Potential	Habitat Conditions	Public Access	Key Modifications
Floodzone: 74.9%	Wetlands: 60.7%		Principal land use: Vacant

Erodible soils: 18.6% Steep slopes: 5.1%	Priority habitats: 1 Species of concern: 5		Imperviousness: 1.9% Roads: 0.4 km

Ecological functions on Reach 8 are relatively intact. The shoreline within this reach is predominantly made up of wetlands identified by the National Wetland Inventory, providing potential habitat for a wide variety of wildlife and fish species. Currently there are no shoreline protection structures along this reach, unlike those found on neighboring Reach 9. However, residential development in the upland is encroaching on the wetland environment and is a potential source of nonpoint pollution such as sediment, fertilizers and pesticides. The road causeway is another potential source of no
npont pollution. The causeway also cuts of the relatively shallower, northern end of the lake from large-scale circulation patterns, thereby allowing the buildup of nutrients and increased eutrophication.

Opportunities For Ecological Protection And Restoration – see Opportunities Map in the Map Portfolio CD (Opportunities.pmf)

Opportunity A: Little or no development and shoreline modifications in wetland and riparian areas offer opportunities for enhancement and protection, including conservation of critical wildlife habitat such as nesting sites and foraging areas. This riparian wetland also helps buffer the lake from nonpoint sources of pollution from the encroaching residential development. Critical habitat can be preserved by purchasing development rights or the title for resource conservancy parks.

Opportunity B: The wetland should be protected from further encroachment by residential development.

Opportunity C: Stormwater diversions or containment ponds could be used to protect the wetland and nearshore habitat from nonpoint pollution runoff from the neighboring highway.

Opportunity D: Improve connectivity between the northern and southern portions of Silver Lake by replacing portions of the highway causeway with a bridge or large culverts.

REACH 9

Abiotic – see Physical Synthesis Map in the Map Portfolio CD (physical.pmf)

Geology, Soils and Hazards (Tables 2 and 3)
The geology of Reach 9 entirely consists of basalt flows (WDNR, 2000). The soils within the SMP jurisdiction are mainly Hesseltine stony silt loam (37.3%) and Hesseltine extremely rocky complex (34.5%) (SCISD, 2004e). Approximately 4.7% of the area has slopes greater than 15% (USGS, 2000). Being relatively flat and low-lying, the floodzone covers approximately 83.8% of this reach (SCISD, 2004d).

Biotic – see Biological Synthesis Map in the Map Portfolio CD (biological.pmf)

Upland

The native vegetation of the area primarily consists of ponderosa pine (*Pinus ponderosa*)-Douglas fir (*Pseudotsuga menziesii)* eastside forest interspersed with bunchgrass "prairies" dominated by Fescue wheatgrass. Much of this has been modified by residential landscaping and clearing along this reach.

Riparian (Table 4)

Emergent vegetation in the littoral zone is restricted to two embayments, with widths ranging between 2 –5 m wide along the shoreline. These two pockets, dominated by bulrush (*Scirpus spp.*), extend along 8.8% of Reach 9. The submergent species include Canadian waterweed (*Elodea canadensis*), northern watermilfoil (*Myriophyllum sibiricum*), sago pondweed (*Potamogeton pectinatus*), curl-leaf pondweed (*Potamogeton crispus*), coontail (*Ceratophyylum demersum*), and muskwort (*Chara sp.*)(Smith et al., 1998). Eurasian watermilfoil (*Myriophyllum spicatum*), an exotic species, has also invaded the lake.

Wetlands (Table 4)

Wetlands are found along 16.9% of the SMP jurisdiction, dominated by the palustrine, emergent, persistent, seasonally flooded class (USFWS, 2003).

Wildlife

Reach 9 may provide potential habitat for numerous terrestrial species, including 78 birds, 29 small mammals and 9 amphibians or reptiles (Table 6C) (WDFW, 1997). These species include the Belted Kingfisher, Big Brown Bat, and Long-toed Salamander. Among these species, the Olive-sided Flycatcher, Willow Flycatcher, Townsend's Big-eared Bat, Yuma Myotis, and the Columbia Spotted Frog are current species of concern (Table 5). In addition, 11.3% of the jurisdiction is classified as a priority wetland habitat, associated with waterfowl concentrations of Mallard, Wigeon, Pintail, Cinnamon Teal, and Redhead Northern Shoveler (WDFW, 2002).

Cultural Modifications - see Cultural Modifications Synthesis Map in the Map Portfolio CD (Cultural_modifications.pmf

Land Use (Table 7)

Of the SMP jurisdiction lands along Reach 9, 33.4% are classified as single family residential, 22.9% are community, 11.5% are classified as vacant land, 8.2% are classified as right of way, and 1.8% are manufactured homes (City of Medical Lake, n.d.). Approximately 0.4% of the land uses are unclassified. There are no parks located along this reach. Impervious surfaces comprise 13.3% of the area in Reach 9.

Transportation Infrastructure (Table 7)

Roadways occupy 1.4 km of SMP jurisdiction land in Reach 9, as well as storm water ditch outlet and a public boat launch (WDNR, 2003).

Shore Protection Structures and Docks (Table 7)
Approximately 34.2% of the shoreline along Reach 9 is protected by shore protection structures. In addition, 55 docks are located along this reach.

Cultural Jurisdictions - see Cultural Jurisdictional Synthesis Map in the Map Portfolio CD (Cultural_jurisdictional.pmf)

Zoning (Table 8)
Current county zoning within the SMP jurisdiction of Reach 9 is principally unclassified (70.3%)(SCISD, 2004b). City zoned land includes institutional (8.3%) and single family residential (0.9%) (City of Medical Lake, 1997). The current environmental designations along Reach 9 are classified as conservancy (52%) and rural (48%) (URS, 2002).

Cultural Resources
There are no Archeological Site Form records of cultural sites with in the SMP jurisdiction of Reach 9 on file with the Washington State Historic Preservation Office.

DOE Facilities and 303(d) Listings
There are no DOE facilities along this reach and Silver Lake is not listed as a 303(d) lake (DOE, 1998).

Ecological Function Summary

Table 17. Reach 9 Shoreline Characterization Summary

Hazard Potential	Habitat Conditions	Public Access	Key Modifications
Floodzone: 83.8% Steep slopes: 4.7%	Wetlands: 16.9% Priority habitats: 1 Species of concern: 5	Boat launches: 1	Principal land use: Single family residential Imperviousness: 13.3% Roads: 1.4 km Bulkheads: 32.7% Storm drains: 1

Ecological functions along Reach 9 are highly impaired by residential development. Riparian vegetation has been largely removed and replaced with lawns, which can promote increased runoff and nonpoint pollution. Impervious surfaces, such as residential roads and buildings, can promote runoff and nonpoint source pollution. The development is presently not on a municipal sewage system, and some of the septic tanks along the reach have failed in the past, leading to water pollution. Water quality may be further impacted by recreational boating and a stormwater discharge at the northern end of the reach, which transports runoff via a ditch from the City of Medical Lake. Extensive bulkheading has increased wave reflectivity, thereby affecting aquatic vegetation and fish habitat. This habitat is further impaired by the large number of docks found in this reach.

Opportunities For Ecological Restoration – see Opportunities Map in the Map Portfolio CD (Opportunities.pmf)

Opportunity A: The stormwater discharge can be retrofitted with a containment pond to reduce nonpoint pollutants entering the lake.

Opportunity B: Further bulkheading should be prevented to minimize adverse effects on the shoreline. Through removing existing structures and preventing more shoreline protection, less damage would occur to the natural shoreline processes. This could coincide with encouragement of planting native vegetation and limiting clearing and disturbance on privately-owned residential properties with shoreline frontage. In addition, the residential development could be equipped with a municipal sewer system to avoid further water quality problems associated with septic tank failures.

Opportunity C: Reduce the proliferation of docks, perhaps by replacing them with a community dock.

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Table 1. SMP Reach Breaks for Inventory and Analysis, City of Medical Lake.

Reach	Length (m)	Start	Reach Break Justification	End
1	811	West line of the SE¼, SW¼, S13, T24E, R40E	Proposed urban growth boundary on West Medical Lake	NE¼, NW¼, S24, T24N, R40E
2	542	NE¼, NW¼, S24, T24N, R40E	Land use change. Beginning of WDFW boat launch/parking area. Existing land use change form pastoral to conservancy. Change from steeper, treed slopes to high use area.	NW¼, NE¼, S24, T24N, R40E
3	1672	NW¼, NE¼, S24, T24N, R40E	End of high use area. Existing land use change form conservancy to pastoral. Change to steeper slopes. Beginning of shallow wetlands along shore.	SE¼, NW¼, S13, T24N, R40E
4	721	SE¼, NW¼, S13, T24N, R40E	Change to erodible soils and steep slopes from no hazards	North line of S13, T24N, R40E
5	715	NW¼, NW¼, S18, T24N, R41E	Medical Lake shoreline. Between Reach 5 and 7 land use changes from residential to institutional.	South line of SW¼, NW¼, S18, T24, R41E
6	1643	South line of SW¼, NW¼, S18, T24, R41E	Change from steep slopes and erodible soils in Reach 5 to no hazards in Reach 6.	NE¼, NW¼, S19, T24, R41E
7	1877	NE¼, NW¼, S19, T24, R41E	Land use change from vacant to residential.	NW¼,NW¼, S18, T24N, R41E
8	961	North line of S17, T24N, R41E	Proposed urban growth boundary on Silver Lake. Mostly wetland shoreline.	South line of SW¼, NE¼, T24N, R41E
9	3008	South line of SW¼, NE¼, T24N, R41E	Causeway crossing. Mostly residential use.	SW¼, SE¼, R20, T24N, R41E

Table 2. Geological and Soil Characteristics of the SMP Jurisdiction, City of Medical Lake.

Reach	Total Acres	Geology		Soils	
		Type	% Area	Type	% Area
1	11.0	Basalt flows	100.0	Caldwell silt loam	4.5

Reach	Total Acres	Geology		Soils	
		Type	% Area	Type	% Area
				Cocolalla silty clay loam, drained	0.4
				Hesseltine silt loam, 0 to 10 percent slopes	19.1
				Hesseltine stony silt loam, 0 to 20 percent slopes	61.3
				Hesseltine stony silt loam, mounded, 0 to 8 percent slopes	14.5
				Reardan silt loam, 5 to 20 percent slopes, eroded	0.2
2	9.1	Basalt flows	100.0	Hesseltine stony silt loam, 0 to 20 percent slopes	2.0
				Hesseltine stony silt loam, mounded, 0 to 8 percent slopes	71.3
				Hesseltine very rocky complex, 0 to 30 percent slopes	26.7
3	24.6	Basalt flows	72.2	Bong coarse sandy loam, 0 to 8 percent slopes	63.8
		Granodiorite	27.8	Hesseltine stony silt loam, 0 to 20 percent slopes	34.2
				Hesseltine very rocky complex, 0 to 30 percent slopes	1.7
				Quarry	0.3
4	10.3	Granodiorite	100.0	Bong coarse sandy loam, 0 to 8 percent slopes	1.8
				Dragoon very rocky complex, 20 to 55 percent slopes	98.2

Reach	Total Acres	Geology		Soils	
		Type	% Area	Type	% Area
5	19.2	Basalt flows	22.7	Bong coarse sandy loam, 0 to 8 percent slopes	3.6
		Granodiorite	77.3	Dragoon stony silt loam, 0 to 30 percent slopes	0.1
				Dragoon very rocky complex, 20 to 55 percent slopes	87.4
				Emdent silt loam	8.4
				Cheny and Uhlig silt loams, 0 to 8 percent slopes	0.5
6	26.3	Basalt flows	36.0	Bong and Phoebe fine sandy loams, 0 to 8 percent slopes	3.5
		Granodiorite	64.0	Bong coarse sandy loam, 0 to 8 percent slopes	51.6
				Hesseltine stony silt loam, mounded, 0 to 8 percent slopes	14.3
				Hesseltine very rocky complex, 0 to 30 percent slopes	30.6
7	29.3	Basalt flows	100.0	Hesseltine stony silt loam, mounded, 0 to 8 percent slopes	100.0
8	43.8	Basalt flows	13.3	Cheney and Uhlig silt loams, 0 to 8 percent slopes	6.4
		Granodiorite	34.0	Cocolalla silty clay loam, drained	31.1
8 (cont.)		Metasedimentary rocks	52.7	Dragoon stony silt loam, 0 to 30 percent slopes	1.1
				Dragoon very rocky complex, 20 to 55 percent slopes	18.5
				Fresh water marsh	18.0

Reach	Total Acres	Geology		Soils	
		Type	% Area	Type	% Area
				Hesseltine extremely rocky complex, 0 to 30 percent slopes	6.2
				Hesseltine silt loam, 0 to 10 percent slopes	10.8
				Hesseltine silt loam, moderately deep, 0 to 8 percent slopes	5.4
				Hesseltine stony silt loam, 0 to 20 percent slopes	2.4
9	53.3	Basalt flows	100.0	Cocolalla silty clay loam, drained	25.0
				Hesseltine extremely rocky complex, 0 to 30 percent slopes	34.5
				Hesseltine stony silt loam, mounded, 0 to 8 percent slopes	37.3
				Hesseltine very rocky complex, 0 to 30 percent slopes	3.2

Table 3. Hazard Characteristics of the SMP Jurisdiction, City of Medical Lake.

Reach	Total Acres	Slopes >15%	Critical Aquifer Recharge Area		Erodible Soils	Floodzone
		% Area	Susceptibility	% Area	% Area	% Area
1	11.0	3.4	Moderate	39.4	0.2	0.7
			Low	60.6		
2	9.1	3.9	Moderate	58.3	None	None
			Low	41.7		
3	24.6	23.1	Moderate	49.7	None	7.7
			Low	50.3		
4	10.3	3.5	Low	100.0	44.5	7.1
5	19.2	28.7	Moderate	3.0	77.5	None
			Low	97.0		

Reach	Total Acres	Slopes >15%	Critical Aquifer Recharge Area		Erodible Soils	Floodzone
		% Area	Susceptibility	% Area	% Area	% Area
6	26.3	36.4	Moderate	31.1	None	None
			Low	68.9		
7	29.3	8.7	Moderate	65.8	None	None
			Low	34.2		
8	43.8	5.1	Moderate	0.2	18.6	74.9
			Low	99.8		
9	53.3	4.7	Moderate	30.7	None	83.8
			Low	52.4		
			High	16.9		

Table 4. Wetland and Aquatic Vegetation Characteristics of the SMP Jurisdiction, City of Medical Lake.

Reach	Wetlands		Aquatic Vegetation	
	Type	% Area	Width (m)	Length (% reach)
1	Palustrine, Emergent, Persistent, Seasonally flooded	31.3	<2	53.1
	Palustrine, Emergent, Persistent, Permanenetly flooded	3.1	5-10	17.9
	Total	34.3	Patchy	27.2
2	Palustrine, Emergent, Persistent, Seasonally flooded	11.3	<2	31.8
3	Palustrine, Emergent, Persistent, Seasonally flooded	1.7	>10	20.8
			Patchy	16.7
4	Palustrine, Aquatic Bed, Floating vascular, Permanently flooded	4.6	>10	34.6
	Palustrine, Emergent, Persistent, Seasonally flooded	0.3	Patchy	51.1

Reach	Wetlands		Aquatic Vegetation	
	Type	% Area	Width (m)	Length (% reach)
5	Palustrine, Emergent, Persistent, Seasonally flooded	13.2	<2	53.4
	Palustrine, Emergent, Persistent, Semi-permanently flooded	20.8		
	Palustrine, Open water/ unkown bottom, Permanently flooded	6.5		
	Total	40.6		
6	Palustrine, Emergent, Persistent, Seasonally flooded	6.3	<2	6.7
6 (cont.)			2-5	20.0
			Patchy	5.9
7	None	0.0	2-5	11.0
			<2	9.1
8	Lacustrine, Littoral, Aquatic Bed, Rooted vascular, Permanently flooded	0.5	2-5	86.7
	Palustrine, Aquatic Bed, Floating Vascular, Permanently flooded	1.1		
	Palustrine, Emergent, Persistent, Seasonally flooded	38.5		
	Palustrine, Emergent, Persistent, Semi-permanently flooded	17.5		
	Palustrine, Forested, Broad leaved deciduous, Seasonally Flooded	1.6		
	Palustrine, Open water/ unkown bottom, Permanently flooded	1.4		
	Total	60.7		
9	Palustrine, Aquatic Bed, Floating vascular, Permanently flooded	0.3	2-5	8.8

Reach	Wetlands		Aquatic Vegetation	
	Type	% Area	Width (m)	Length (% reach)
	Palustrine, Emergent, Persistent, Seasonally flooded	13.4		
	Palustrine, Scrub-shrub, Broad-leaved deciduous, Seasonally Flooded	3.2		
	Total	16.9		

Table 5. Species Characteristics of the SMP Jurisdiction, City of Medical Lake.

Reach	Species of Concern	Priority Habitat and Species	
		Type	% Area
1	Townsend`s Big-eared Bat	Wetlands	10.1
	Yuma Myotis	Waterfowl Concentrations	49.0
	Olive-sided Flycatcher		
	Willow Flycatcher		
	Columbia Spotted Frog		
2	Townsend`s Big-eared Bat	Wetlands	83.9
	Yuma Myotis		
	Olive-sided Flycatcher		
	Willow Flycatcher		
	Columbia Spotted Frog		
3	Townsend`s Big-eared Bat	Wetlands	60.4
	Yuma Myotis		
	Olive-sided Flycatcher		
	Willow Flycatcher		
	Columbia Spotted Frog		
4	Townsend`s Big-eared Bat	Wetlands	57.5
	Yuma Myotis	Waterfowl Concentrations	2.4
	Olive-sided Flycatcher		

Reach	Species of Concern	Priority Habitat and Species	
		Type	% Area
	Willow Flycatcher		
	Columbia Spotted Frog		
5	Townsend`s Big-eared Bat	Wetlands	15.9
	Yuma Myotis	Waterfowl Concentrations	36.4
	Olive-sided Flycatcher		
	Willow Flycatcher		
	Columbia Spotted Frog		
6	Townsend`s Big-eared Bat	Wetlands	26.7
	Yuma Myotis		
	Olive-sided Flycatcher		
	Willow Flycatcher		
	Columbia Spotted Frog		
7	Townsend`s Big-eared Bat	None	0.0
	Yuma Myotis		
	Olive-sided Flycatcher		
	Willow Flycatcher		
	Columbia Spotted Frog		
8	Townsend`s Big-eared Bat	Wetlands	94.0
	Yuma Myotis		
	Olive-sided Flycatcher		
	Willow Flycatcher		
	Columbia Spotted Frog		
9	Townsend`s Big-eared Bat	Wetlands	11.3
	Yuma Myotis		
	Olive-sided Flycatcher		
	Willow Flycatcher		
	Columbia Spotted Frog		

Table 6A. GAP Analysis of Species Habitat on West Medical Lake, City of Medical Lake.

Mammals	Birds		Amphibians/Reptiles
Beaver	American Coot	Long-eared Owl	Long-toed Salamander
Big Brown Bat	American Kestrel	MacGillivray`s Warbler	Pacific Treefrog
Bobcat	American Robin	Mallard	Columbia Spotted Frog*
Bushy-tailed Woodrat	American/Northwestern Crow	Marsh Wren	Bullfrog
California Myotis	Bank Swallow	Northern Flicker	Painted Turtle
Coyote	Barn Owl	Northern Harrier	Northern Alligator Lizard
Deer Mouse	Barn Swallow	Northern Pintail	Western Skink
Elk	Belted Kingfisher	Northern Rough-winged Swallow	Western Terrestrial Garter Snake
Fringed Myotis	Black Tern	Olive-sided Flycatcher*	Common Garter Snake
Hoary Bat	Black-billed Magpie	Pied-billed Grebe	
Little Brown Myotis	Black-capped Chickadee	Redhead	
Long-eared Myotis	Black-chinned Hummingbird	Red-naped Sapsucker	
Long-legged Myotis	Black-headed Grosbeak	Red-necked Grebe	
Long-tailed Vole	Brewer`s Blackbird	Red-tailed Hawk	
Long-tailed Weasel	Brown-headed Cowbird	Red-winged Blackbird	
Meadow Vole	Bullock`s Oriole	Ring-necked Duck	
Mink	California Quail	Rock Dove	
Montane Vole	Canada Goose	Rock Wren	
Mule Deer	Cedar Waxwing	Ruddy Duck	
Muskrat	Cinnamon Teal	Ruffed Grouse	
Porcupine	Cliff Swallow	Song Sparrow	
Raccoon	Common Merganser	Sora	
Silver-haired Bat	Common Nighthawk	Spotted Sandpiper	
Striped Skunk	Common Raven	Spotted Towhee	
Townsend`s Big-eared Bat*	Common Snipe	Steller`s Jay	
Vagrant Shrew	Cooper`s Hawk	Tree Swallow	

Mammals	Birds		Amphibians/Reptiles
White-tailed Deer	Downy Woodpecker	Turkey Vulture	
Yuma Myotis*	Eastern Kingbird	Violet-green Swallow	
	European Starling	Virginia Rail	
	Gray Catbird	Western Kingbird	
	Great Blue Heron	Western Screech-Owl	
	Great Horned Owl	Western Wood-Pewee	
	Green-winged Teal	Willow Flycatcher*	
	Hooded Merganser	Wilson`s Phalarope	
	House Finch	Wood Duck	
	House Wren	Yellow Warbler	
	Killdeer	Yellow-breasted Chat	
	Lazuli Bunting	Yellow-headed Blackbird	
* federal or state species of concern			

Table 6B. GAP Analysis of Species Habitat on Medical Lake, City of Medical Lake.

Mammals	Birds		Amphibians/Reptiles
Beaver	American Coot	Long-eared Owl	Bullfrog
Big Brown Bat	American Kestrel	MacGillivray`s Warbler	Columbia Spotted Frog*
Bobcat	American Robin	Mallard	Common Garter Snake
Bushy-tailed Woodrat	American/Northwestern Crow	Marsh Wren	Long-toed Salamander
California Myotis	Bank Swallow	Northern Flicker	Northern Alligator Lizard
Coyote	Barn Owl	Northern Harrier	Pacific Treefrog
Deer Mouse	Barn Swallow	Northern Pintail	Painted Turtle
Elk	Belted Kingfisher	Northern Rough-winged Swallow	Western Skink
Fringed Myotis	Black Tern	Olive-sided Flycatcher*	Western Terrestrial Garter Snake
Hoary Bat	Black-billed Magpie	Pied-billed Grebe	
Little Brown Myotis	Black-capped Chickadee	Redhead	

Mammals	Birds		Amphibians/Reptiles
Long-eared Myotis	Black-chinned Hummingbird	Red-naped Sapsucker	
Long-legged Myotis	Black-headed Grosbeak	Red-necked Grebe	
Long-tailed Vole	Blue-winged Teal	Red-tailed Hawk	
Long-tailed Weasel	Brewer`s Blackbird	Red-winged Blackbird	
Meadow Vole	Brown-headed Cowbird	Ring-necked Duck	
Mink	Bullock`s Oriole	Rock Dove	
Montane Vole	California Quail	Rock Wren	
Mountain Lion	Canada Goose	Ruddy Duck	
Mule Deer	Cedar Waxwing	Ruffed Grouse	
Muskrat	Cinnamon Teal	Song Sparrow	
Porcupine	Cliff Swallow	Sora	
Raccoon	Common Merganser	Spotted Sandpiper	
Silver-haired Bat	Common Nighthawk	Spotted Towhee	
Striped Skunk	Common Raven	Steller`s Jay	
Townsend`s Big-eared Bat*	Common Snipe	Tree Swallow	
Vagrant Shrew	Cooper`s Hawk	Turkey Vulture	
White-tailed Deer	Downy Woodpecker	Violet-green Swallow	
Yuma Myotis*	Eastern Kingbird	Virginia Rail	
	European Starling	Western Kingbird	
	Gray Catbird	Western Screech-Owl	
	Great Blue Heron	Western Wood-Pewee	
	Great Horned Owl	Willow Flycatcher*	
	Green-winged Teal	Wilson`s Phalarope	
	Hooded Merganser	Wood Duck	
	House Finch	Yellow Warbler	
	House Wren	Yellow-breasted Chat	
	Killdeer	Yellow-headed Blackbird	
	Lazuli Bunting		
* federal or state species of concern			

Table 6C. GAP Analysis of Species Habitat on Silver Lake, City of Medical Lake.

Mammals	Birds		Amphibians/Reptiles
Beaver	American Bittern	Lazuli Bunting	Bullfrog
Big Brown Bat	American Coot	Long-eared Owl	Columbia Spotted Frog*
Bobcat	American Kestrel	MacGillivray`s Warbler	Common Garter Snake
Bushy-tailed Woodrat	American Robin	Mallard	Long-toed Salamander
California Myotis	American/Northwestern Crow	Marsh Wren	Northern Alligator Lizard
Coyote	Bank Swallow	Northern Flicker	Pacific Treefrog
Deer Mouse	Barn Owl	Northern Harrier	Painted Turtle
Elk	Barn Swallow	Northern Pintail	Western Skink
Fringed Myotis	Belted Kingfisher	Northern Rough-winged Swallow	Western Terrestrial Garter Snake
Hoary Bat	Black Tern	Olive-sided Flycatcher*	
Little Brown Myotis	Black-billed Magpie	Pied-billed Grebe	
Long-eared Myotis	Black-capped Chickadee	Redhead	
Long-legged Myotis	Black-chinned Hummingbird	Red-naped Sapsucker	
Long-tailed Vole	Black-headed Grosbeak	Red-necked Grebe	
Long-tailed Weasel	Blue-winged Teal	Red-tailed Hawk	
Meadow Vole	Brewer`s Blackbird	Red-winged Blackbird	
Mink	Brown-headed Cowbird	Ring-necked Duck	
Montane Vole	Bullock`s Oriole	Rock Dove	
Mountain Lion	California Quail	Rock Wren	
Mule Deer	Canada Goose	Ruddy Duck	
Muskrat	Cedar Waxwing	Ruffed Grouse	
Porcupine	Cinnamon Teal	Song Sparrow	
Raccoon	Cliff Swallow	Sora	
Silver-haired Bat	Common Merganser	Spotted Sandpiper	
Striped Skunk	Common Nighthawk	Spotted Towhee	

Mammals	Birds		Amphibians/Reptiles
Townsend`s Big-eared Bat*	Common Raven	Steller`s Jay	
Vagrant Shrew	Common Snipe	Tree Swallow	
White-tailed Deer	Cooper`s Hawk	Turkey Vulture	
Yuma Myotis*	Downy Woodpecker	Violet-green Swallow	
	Eastern Kingbird	Virginia Rail	
	European Starling	Western Kingbird	
	Gray Catbird	Western Screech-Owl	
	Great Blue Heron	Western Wood-Pewee	
	Great Horned Owl	Willow Flycatcher*	
	Green-winged Teal	Wilson`s Phalarope	
	Hooded Merganser	Wood Duck	
	House Finch	Yellow Warbler	
	House Wren	Yellow-breasted Chat	
	Killdeer	Yellow-headed Blackbird	
* federal or state species of concern			

Table 7. Cultural Modifications of the SMP Jurisdiction, City of Medical Lake.

Reach	Total Reach Length (m)	Boat Launches (#)	Docks (#)	Bulkheads (% Length)	Total Road Length (km)	Parks (% Area)	Land use		Impervious Surfaces
							Type	% Area	% Area
1	811	0	0	0.0	0.0	0.0	Community	100.0	0.0
2	542	2	2	8.1	0.2	0.0	Community	90.9	32.2
							Unclassified	9.1	
3	1672	0	1	0.0	0.5	0.0	Community	100.0	0.0
4	721	0	0	0.0	0.5	0.0	Community	100.0	0.0
5	715	0	1	3.6	0.8	43.1	Community	68.3	2.7
							Vacant Land	21.0	
							Unclassified	1.2	

Reach	Total Reach Length (m)	Boat Launches (#)	Docks (#)	Bulkheads (% Length)	Total Road Length (km)	Parks (% Area)	Land use		Impervious Surfaces
							Type	% Area	% Area
6	1643	1	0	0.0	1.0	79.1	Community	100.0	3.1
7	1877	0	20	17.7	1.3	17.0	Single Family Residential	38.1	15.4
							Vacant Land	15.6	
							Community	12.5	
							Unclassified	2.5	
							2-4 Dwelling Units	2.2	
							Manufactured Homes	1.0	
8	961	0	0	0.0	0.4	0.0	Vacant Land	86.5	1.9
							Single Family Residential	5.7	
							Retail	3.3	
							Manufactured Homes	3.2	
9	3008	1	55	32.7	1.4	0.0	Single Family Residential	33.4	13.3
							Community	22.9	
							Vacant Land	11.5	
							ROW	8.2	
							Manufactured Homes	1.8	
							Unclassified	0.4	

Table 8. Cultural Jurisdiction Characteristics of the SMP Jurisdiction, City of Medical Lake.

Reach	Zoning		Features		Existing Environmental Designations	
	Type	% Area	Type	(#)	Designation	% Area
1	Institutional	90.4	Pump Station	1	Pastoral	100.0
	Unclassified	9.6				
2	Institutional	90.9	Boat Launch	2	Conservancy	100.0
	Unclassified	9.1				
3	Institutional	92.2	Pump Station	1	Pastoral	100.0
	Not Zoned	7.8	Sewage Outfall	1		
4	Institutional	91.4	N/A	0	Pastoral	100.0
		8.6				
5	Institutional	85.2	N/A	0	Conservancy	100.0
	Unclassified	1.2				
	Single Family Residential	4.2				
6	Institutional	80.9	Boat Launch	1	Conservancy	100.0
	Unclassified	19.1				
7	Institutional	12.5	Stormwater Drains	2	Urban	100.0
	Single Family Residential	55.5				
	Multi-Family Residential	0.7				
	Unclassified	3.1				
8	Rural Conservation	100	N/A	0	Pastoral	100.0

Reach	Zoning		Features		Existing Environmental Designations	
	Type	% Area	Type	(#)	Designation	% Area
9	Unclassified	70.3	Boat Launch	1	Conservancy	52.0
	Institutional	8.3	Stormwater Drain	1	Rural	48.0
	Single Family Residential	0.9				